

Cutaneous reflex modulation and self-induced reflex attenuation in cerebellar patients

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Abstract

BACKGROUND AND AIM:

Modulation of cutaneous reflexes is important in the neural control of walking. It has extensively been studied, but knowledge about underlying neural pathways is still incomplete [1]. Recent animal studies have suggested that the cerebellum is important for the modulation of cutaneous reflexes during gait [2]. Other studies in humans have shown that such reflexes can be attenuated when stimulation is self-induced and it was suggested that the cerebellum is important for this [3]. Here, we evaluated these cutaneous reflex features in cerebellar patients.

METHODS:

We analyzed cutaneous reflex activity during walking, both in patients with a focal cerebellar lesion and in healthy controls. We recorded electromyography bilaterally in the tibialis anterior, gastrocnemius medialis and biceps femoris muscles. Stimuli were applied to the sural nerve at the ankle. Reflex modulation patterns were compared between groups. Additionally, we compared reflexes after standard (computer-triggered) stimuli to reflexes after self-induced stimuli in both groups. Self-induced stimuli were triggered by the participants through pressing a handheld button.

RESULTS:

Cutaneous reflex modulation patterns were similar between healthy controls and cerebellar patients, but cerebellar patients were less able to attenuate reflexes to self-induced stimuli in the tibialis anterior muscle of the stimulated leg. In healthy controls, these reflexes to self-induced stimuli were more often attenuated than in the patient group, mainly at the end of the stance phase and during the swing phase.

CONCLUSIONS:

The results suggest that the cerebellum is important in anticipation of the consequences of motor actions but that it has probably no major role in cutaneous reflex modulation in humans.

REFERENCES:

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